Anticollision Equipment for Car Bumper

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Abstract: Most of the vehicle manufacturing Companies is unable successfully to control this matter. This report handles the optimal design of a passive spring-damper buffer that can be attached to the vehicle from its front, rear or both sides to avoid catastrophic effects due to collision. In modern society of industrialization, there are more and more cars running on the roads with the rise of traffic accidents between cars, we need to put more attention to the front of the cars. Hence we design a device which can be fixed on the front beams of the car chassis. It's called anti-collision equipment to avoid the cars crash on the signals and other places. Now a day's BUMPERS are used in vehicles to reduce the impact of accidents but because of accidents it will be damaged or break.

Keywords: Anticollision, Car Bumper, design.

I. INTRODUCTION

Now a day's too many cars crash on the road every day. Most of the vehicle manufacturing Companies is unable successfully to control this matter. This report handles the optimal design of a passive spring-damper buffer that can be attached to the vehicle from its front, rear or both sides to avoid catastrophic effects due to collision. In modern society of industrialization, there are more and more cars running on the roads with the rise of traffic accidents between cars, we need to put more attention to the front of the cars. Hence we design a device which can be fixed on the front beams of the car chassis. It's called anti-collision equipment to avoid the cars crash on the signals and other places. Now a day's BUMPERS are used in vehicles to reduce the impact of accidents but because of accidents it will be damaged or break. To avoid this damage or breakage we use anti-collision equipment to the front of the vehicle. The car we choose to study is the hatchback.

The main purpose of this report is to design anti-collision equipment which can be fixed on the front beam of the car chassis in order to avoid cars crash.

During the design process, the main problem arises as we intend to make the anti-collision device to absorb the energy. When the crash is at low speed, the energy absorption board and non-Newtonian fluid damper will absorb energy (the device is not damaged) so that user does not need to change the device and that will save your money, but when the accident impact is really high, the limit block will be cut and three parts will work together to save car driver's life. The limit block is designed in a way that it remains intact before a certain magnitude of impact force. Below Fig show Methodology.

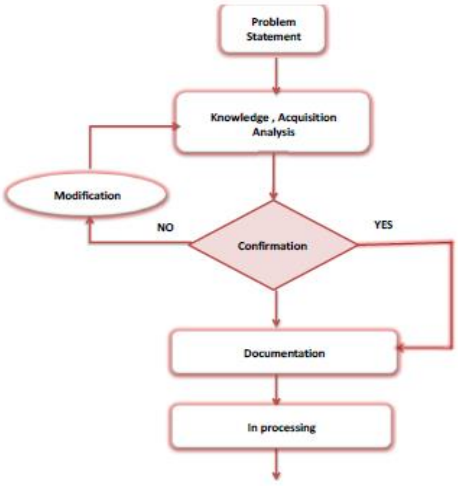

Fig: 1 Methodology

As per reference of standard dimensions of spring and guide. We made basic drawing of our project. Instead of hydraulic buffers use in railway, we use spring guide system to reduce frontal impact on cars and their chassis.

II. LITERATURE SURVEY

A. Priya Prasad etal, Studied

Vehicle compatibility has been investigated in many studies using different approaches such as real word crash statistics, crash testing and computer modeling NHTSA used U.S. crash statistics from the fatality Analysis reporting system(FARS) to determine the no of fatalities in vehicle to vehicle collision Field data analysis shows that side impact can be severe harm producing crashes, even though they occurs less frequently than frontal impact.

Fundamental physics and numerous fill studies have clearly shown a higher fatality risk for occupants in smaller and lighter vehicles when colliding with the heavier one, especially when he struck vehicles is a passenger car and the striking vehicle is an LTV or an SUV. The consensus is that the significant parameters influencing compatibility in front to side crashes are geometric interaction, vehicle stiffness, and vehicle mass. The effect of each individual design parameter, however is not clearly understood.

B. Bumper Thickness And Width

Bumper size expressed by its weight in the vertical direction and bumper metal thickness wear consider as design parameter in this study. Three bumper width levels and four bumper metal thickness level were selected to be evaluated for their effect on the stuck vehicle occupants TTI and pelvis responses. The number of factors and levels included in this study describe a sizable design space. Numerous techniques exist for constructing experimental design that specify a minimal no. Of samples throughout the design space required to characterize the responses. Pair- wise comparison of the predicted effects of the design variables show the relative importance of each factor.

C. HuanHan etal studied

This research paper related to a truck front end multilevel buffer anti-collision device. The inventory mainly solve the problem of the safety hidden danger of car collided with a truck. Although there are many anti-collision equipment applied on trucks, they are no good enough yet.

The purpose of this is to design anti-collision equipment which can be fixed on the rear beam of the truck chassis in order to avoid car crash into the tail of the truck. During the design process as they intend to make the anti-collision device to absorb the energy piecewise. When the crash is at low speed, though energy absorption board and non-Newtonian fluid damper wheel absorb energy so that user does not need to change the device and that will save our money, but when the accident impact is really high , the limit block wheel be cut an three parts wheel work together to save car drivers life. The limits block is design in a way that it remains intact before a certain magnitude of impact force.

III. DESIGN

A. SPRING

In this project spring is the major component of the system. A spring is an elastic object used to store mechanical energy. Spring is made by mild steel. When a coil spring is compressed or stretched slightly from rest, the force it exerts is approximately proportional to its change in length (this approximation breaks down for larger deflections). The rate or spring constant of a spring is the change in force it exerts, divided by the change in deflection of the spring.

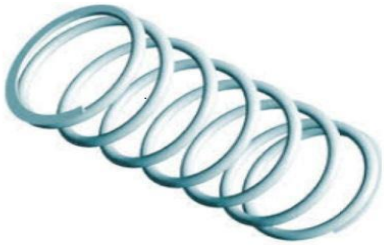

Fig. 2 Spring

B. Front plate

Front plate is provide a support to the guide and spring, Guide and spring is mounted on the front plate. Locking system is also attached to the front plate. The Impact load is mostly acted on the system which is absorbed by spring and load distributed on the front plate. Front plate is made up of mild steel as this material is provide greater strength. The various operation are used to make front plate such as cutting and bending.

Fig. 3 Frame

C. Back plate

Back plate is a very important part of the system, on which whole system is mounted. Back plates is provide a support to the whole system. All the force acted by the impact may be transfer on back plates hence we require high strength, due to this we use mild steel for making back plates.

Fig. 4 Back plate

IV. ANALYSIS OF THE SYSTEM

1. System design before applying impact force

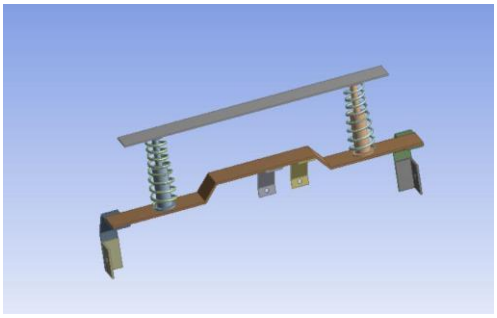

Fig. 5 Design of the system

Front plate is provide a support to the guide and spring, Guide and spring is mounted on the front plate. Locking system is also attached to the front plate. The Impact load is mostly acted on the system which is absorbed by spring and load distributed on the front plate. Front plate is made up of mild steel as this material is provide greater strength. The various operation are used to make front plate such as cutting and bending.

2. Loading and boundary condition

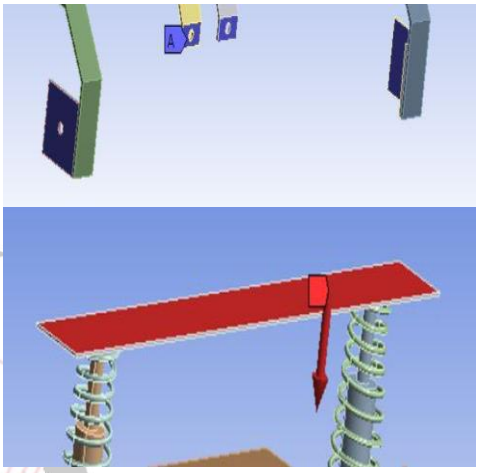

Fig. 6 Loading and boundary condition

Back plate is a very important part of the system, on which whole system is mounted. Back plates is provide a support to the whole system. All the force acted by the impact may be transfer on back plates hence we require high strength, due to this we use mild steel for making back plates.

V. CONCLUSION

At the end of project, we concluded that, this system is useful for bumper safety purpose. To avoid catastrophic effect on the car's front side bumper, we use the spring guide system to resist the impact force which is act on the bumper. This system provide safety for car as well as driver. It reduce the maintenances after car crash. The main advantage of the system is mostly use at the time of traffic in city and parking area.

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